

CLAIMS

What is claimed is:

1. An isolated nucleic acid fragment encoding a plant MFP1 protein selected from the group consisting of:

- 5 (a) an isolated nucleic acid fragment encoding all or a substantial portion of the amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:20, SEQ ID NO:22 and SEQ ID NO:24;
- 10 (b) an isolated nucleic acid fragment that is substantially similar to an isolated nucleic acid fragment encoding all or a substantial portion of the amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:20, SEQ ID NO:22 and SEQ ID NO:24;
- 15 (c) an isolated nucleic acid molecule that hybridizes with a nucleic acid sequence of (a) or (b) under the following hybridization conditions: 5 x Denhards, 5 x SSPE, 5% SDS, 20 µg/mL salmon sperm DNA at 55 °C;
- 20 (d) an isolated nucleic acid molecule that hybridizes with a nucleic acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:21 and SEQ ID NO:23 under the following hybridization conditions: 5 x Denhards, 5 x SSPE, 5% SDS, 20 µg/mL salmon sperm DNA at 55 °C; and
- 25 (e) an isolated nucleic acid fragment that is complementary to (a), (b), (c) or (d).

2. The isolated nucleic acid fragment of Claim 1 selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:21 and SEQ ID NO:23.

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3. A polypeptide encoded by the isolated nucleic acid fragment of Claim 1.

4. The polypeptide of Claim 3 selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:20, SEQ ID NO:22 and SEQ ID NO:24.

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5. A nucleic acid fragment, isolated from corn, encoding an MFP1 polypeptide, the polypeptide having at least 40% identity to SEQ ID NO:17, over a length of about 672 amino acids as compared by the Jotun-Hein algorithm.

6. An MFP1 polypeptide encoded by the nucleic acid fragment of Claim 5.
7. A nucleic acid fragment, isolated from soybean, encoding an MFP1 polypeptide, the polypeptide having at least 46% identity to SEQ ID NO:17 over a length of 388 amino acids as compared by the Jotun-Hein algorithm.
8. An MFP1 polypeptide, encoded by the nucleic acid fragment of Claim 7.
9. A nucleic acid fragment, isolated, from rice, encoding an MFP1 polypeptide, the polypeptide having at least 39% identity to SEQ ID NO:17 over a length of 107 amino acids as compared by the Jotun-Hein algorithm.
10. An MFP1 polypeptide, encoded by the nucleic acid fragment of Claim 9.
11. An isolated nucleic acid fragment encoding a plant MFP1 polypeptide, the peptide having at least 77% identity to SEQ ID NO:17.
12. An MFP1 polypeptide encoded by the nucleic acid fragment of Claim 11.
13. A chimeric gene comprising the isolated nucleic acid fragment of any of Claims 1, 5, 7, 9, and 11 operably linked to suitable regulatory sequences.
14. A transformed host cell comprising a host cell and the chimeric gene of Claim 13.
15. The transformed host cell of Claim 14 wherein the host cell is a plant cell.
16. The transformed host cell of Claim 14 wherein the host cell is *E. coli*.
17. A method of altering the level of expression of a plant MFP1 protein in a host cell comprising:
- (a) transforming a host cell with the chimeric gene of Claim 13 and;
  - (b) growing the transformed host cell produced in step (a) under conditions that are suitable for expression of the chimeric gene resulting in production of altered levels of a plant MFP1 protein in the transformed host cell relative to expression levels of an untransformed host cell.
18. A method of obtaining a nucleic acid fragment encoding all or a substantial portion of the amino acid sequence encoding a plant MFP1 protein comprising:
- (a) probing a cDNA or genomic library with the nucleic acid fragment of Claim 1;
  - (b) identifying a DNA clone that hybridizes with the nucleic acid fragment of Claim 1; and

- (c) sequencing the cDNA or genomic fragment that comprises the clone identified in step (b),

wherein the sequenced cDNA or genomic fragment encodes a plant MFP1 protein

19. A method of obtaining a nucleic acid fragment encoding all or a substantial portion of the amino acid sequence encoding a plant MFP1 protein comprising:

- (a) synthesizing at least one oligonucleotide primer corresponding to a portion of the sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:21 and SEQ ID NO:23;

- (b) amplifying a cDNA insert present in a cloning vector using the oligonucleotide primer of step (a);

wherein the amplified cDNA insert encodes a plant MFP1 protein.

20. The product of the method of Claims 18 or 19.